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INSTRUMENTATION AND CONTROL

U.S. Department of Energy
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ABSTRACT

Instrumentation and Control was developed to assist nuclear facility operating contractors provide operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of instrumentation and control systems. The handbook includes information on temperature, pressure, flow, and level detection systems; position indication systems; process control systems; and radiation detection principles. This information will provide personnel with an understanding of the basic operation of various types of DOE nuclear facility instrumentation and control systems.

Key Words: Training Material, Temperature Detection, Pressure Detection, Level Detection, Flow Detection, Position Indication, Radiation Detection, Process Control

FOREWORD

Instrumentation and Control was prepared as an information resource for personnel who are responsible for the operation of the Department's nuclear facilities. A basic understanding of instrumentation and control is necessary for DOE nuclear facility operators, maintenance personnel, and the technical staff to safely operate and maintain the facility and facility support systems. The information in this text is presented to provide a foundation for applying engineering concepts to the job. This knowledge will help personnel more fully understand the impact that their actions may have on the safe and reliable operation of facility components and systems.

Instrumentation and Control consists of seven modules. The following is a brief description of the information presented in each module of the handbook.

Module 1 Temperature Detectors

This module describes the construction, operation, and failure modes for various types of temperature detectors and indication circuits.

Module 2 Pressure Detectors

This module describes the construction, operation, and failure modes for various types of pressure detectors and indication circuits.

Module 3 Level Detectors

This module describes the construction, operation, and failure modes for various types of level detectors and indication circuits.

Module 4 Flow Detectors

This module describes the construction, operation, and failure modes for various types of flow detectors and indication circuits.

Module 5 Position Indicators

This module describes the construction, operation, and failure modes for various types of position indicators and control circuits.

Module 6 Radiation Detectors

This module describes the principles of radiation detection, detector operation, circuit operation, and specific radiation detector applications.

Module 7 Principles of Control Systems

This module describes the principles of operation for control systems used in evaluating and regulating changing conditions in a process.

The information contained in this text is by no means all encompassing. An attempt to present the entire subject of instrumentation and control would be impractical. However, *Instrumentation and Control* does present enough information to provide the reader with a fundamental knowledge level sufficient to understand the advanced theoretical concepts presented in other subject areas, and to better understand basic system and equipment operations.